

BOARD OF INTERMEDIATE & SECONDARY EDUCATION, SAHRAWAL

SUBJECT: MATHS EXAM 2nd Annual 2022 CLASS: Inter Part
 GROUP: I DATE: 21-12-22 9/3

(GENERAL INSTRUCTIONS FOR MARKING KEY)

(ix)
$$A^t = \begin{bmatrix} -1 & 1 & 2 \\ 2 & 4 & -1 \end{bmatrix}$$

$$B^t = \begin{bmatrix} 1 & -2 \\ 3 & 1 \end{bmatrix} \quad (1M)$$

$$B^t A^t = \begin{bmatrix} 1 & -2 \\ 3 & 1 \end{bmatrix} \begin{bmatrix} -1 & 1 & 2 \\ 2 & 4 & -1 \end{bmatrix} \quad (1M)$$

$$= \begin{bmatrix} -5 & -7 & 4 \\ -1 & 7 & 5 \end{bmatrix} \quad (1M)$$

(x) Let $x = \sqrt[3]{64}$
 $x^3 - 4 = 0$
 $(x-4)(x^2 + 4x + 16) = 0$
 $x-4=0$ or $x^2 + 4x + 16 = 0 \quad (1M)$
 $x=4$ $x = \frac{-4 \pm \sqrt{16-64}}{2}$
 $x = -4(1 \pm i\sqrt{3})$
 or $x = 4, 4\omega, 4\omega^2 \quad (1M)$

(xi) Statement (1M)
 Proof: By dividing $f(x)$ by $x-a$,
 $g(x)$ be the quotient while R is
 remainder, by Remainder Theorem
 $f(x) = (x-a)g(x) + R$
 Since $f(a) = 0 \Rightarrow R = 0$
 $\Rightarrow f(x) = (x-a)g(x)$
 $\Rightarrow (x-a)$ is factor of $f(x)$
 Conversely, if $(x-a)$ is a factor
 of $f(x)$, then $R = f(a) = 0. \quad (1M)$

(xii) Let α and 2α be the
 roots of $x^2 + px + q = 0$
 $\alpha + 2\alpha = 3\alpha = -p \quad (1M)$
 $\alpha = -\frac{p}{3}$
 $2\alpha^2 = q \quad (1M)$
 Utilizing (i) in (ii), we obtain
 $2\left(-\frac{p}{3}\right)^2 = q$
 $2p^2 = 9q \quad (1M)$

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